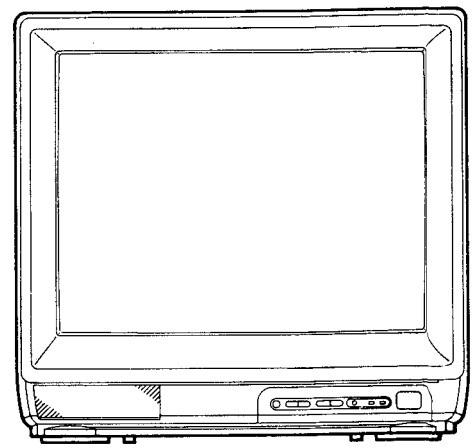
1748

SERVICE DATA
FILE NO. 050-579
PAL-B/G SYSTEM

TOSHIBA
COLOUR TELEVISION
2121RD



SPECIFICATIONS

Input Power Rating:	93 W, AC 220 V, 50 Hz
Aerial Input Impedance:	75 ohm unbalanced type for VHF and UHF
Receiving Channels:	**PAL B/G Standard** VHF ..... channels 2 to 4, 5 to 12 and S3 to S20 UHF ..... channels 21 to 69
Intermediate Frequencies:	Picture I-F carrier frequency ..... 38.9 MHz Sound I-F carrier frequency ..... 33.4 MHz
Picture Tube:	21 inches, A51EAL30X01, 510 mm (measured on diagonal of viewable picture area), 90° deflection
Sound Output:	3.0 W (at 10% harmonic distortion)
Speaker:	70 mm x 60 mm oval
Aux. Terminals:	Headphone Jack
Dimensions:	Height ..... 482 mm Width ..... 511 mm Depth ..... 485 mm
Weight:	20.5 kg

Specifications are subject to change without notice.

Printed in Japan Nov. 1992 (So)

1748

SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

X-RAY RADIATION PRECAUTION

1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 27.5 kV at zero beam current (minimum brightness) operating at 220V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 29.0 kV. When checking the E.H.T., use the 'High Voltage Check' procedure in this manual using an accurate E.H.T. voltmeter.
2. The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.
   For continued safety, replacement component should only be made after referring the Product Safety Notice below.

SAFETY PRECAUTION

1. This receiver has a nominal working E.H.T. voltage of 25.0 kV. Extreme caution should be exercised when working on the receiver with the back removed.
   Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.
   When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap
   The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling.
   Do not hold the C.R.T. by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
4. Replace blown fuses within the receiver with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

FRONT CONTROLS AND REAR VIEWS

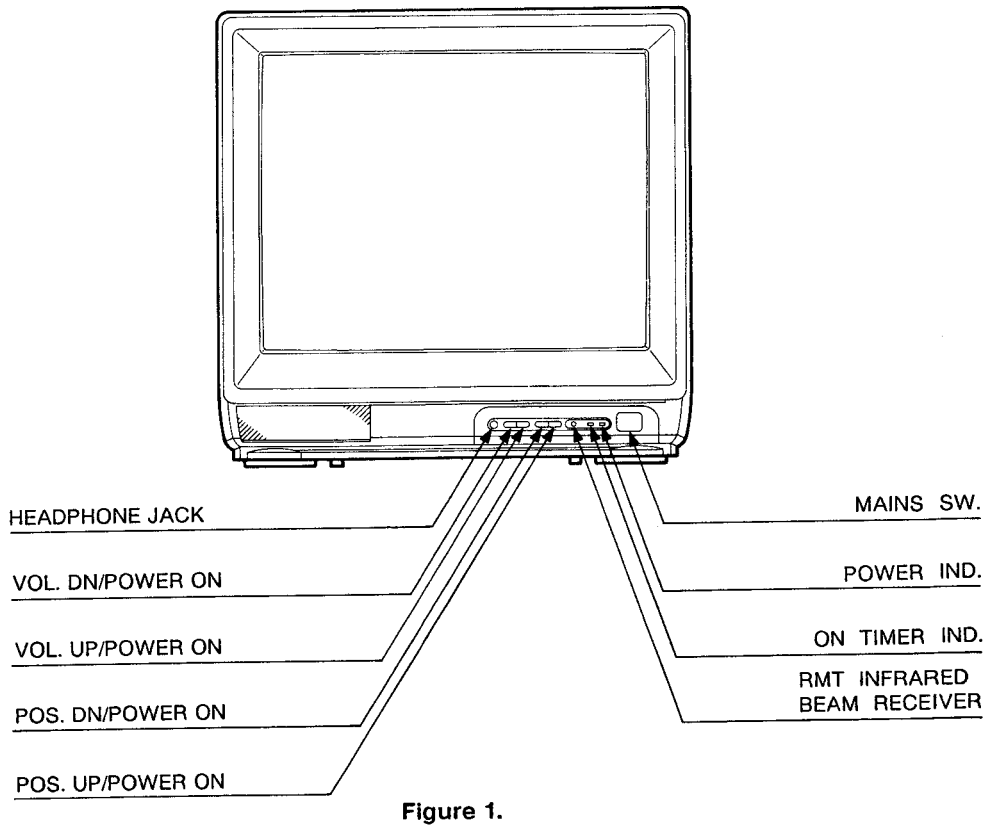


Figure 1.

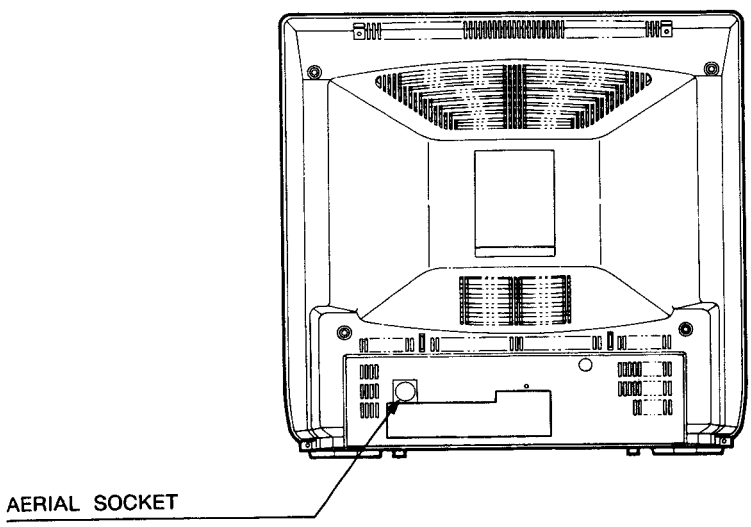


Figure 2.

REMOTE HAND HELD UNIT

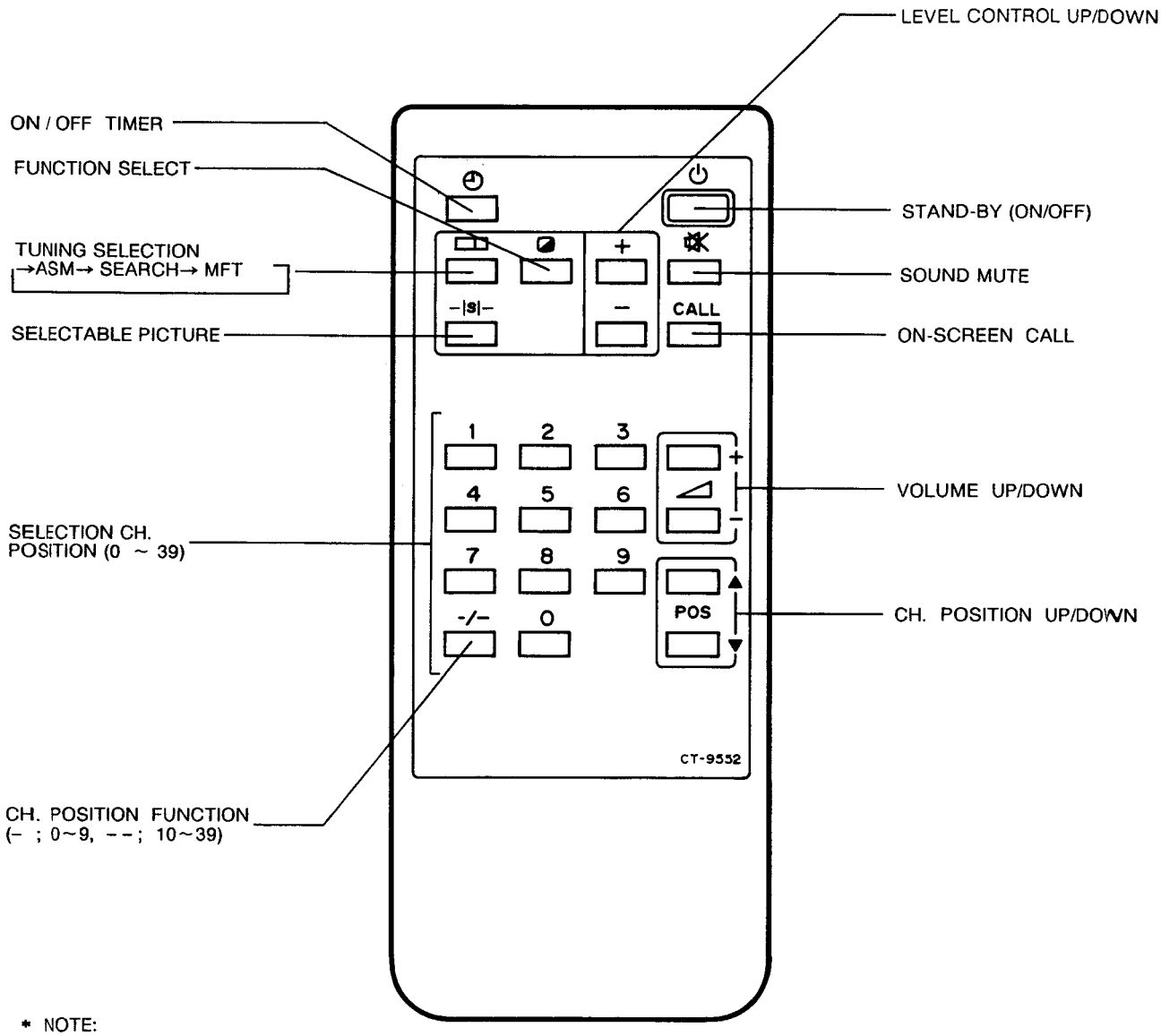


Figure 3.

* NOTE:
  (1) ASM (AUTO SEARCH MEMORY)
  Select the ASM mode by Tuning Search and then push the " ± " key
  U AUTO Tuning
  (2) SEARCH
  Select the SEARCH memory by Tuning Select and then
  Push the " + " key V Search
  Push the "–" key U Search
  (3) MFT (Manual Fine Tuning)
  Select the MFT mode by Tuning Select and then
  Push the " + " key MFT UP
  Push the "–" key MFT DOWN

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

INSTALLATION AND SERVICE ADJUSTMENTS

GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials.

Plug the power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least one hour in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures.

+120 VOLT POWER SUPPLY ADJUSTMENT (R851)

CAUTION: +B voltage closely relates to the high voltage. To prevent hazardous X-RAY RADIATION, the +B voltage must be properly adjusted to +120 volts.

1. Tune in an active channel. Adjust the BRIGHTNESS and CONTRAST Controls for normal picture.
2. Check that the AC power Line voltage is normal. (AC 220 volts, 50 Hz)
3. Connect a digital voltmeter to both leads of C451.
4. Adjust R851 for 120V reading on the meter.
5. Remove the digital voltmeter.

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 29.0 kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 29.0 kV under any conditions.

HEIGHT ADJUSTMENT

1. Receive the WG PHILIPS pattern, and set the contrast and colour to minimum, and the brightness to centre.
2. Change the VERT POSITION SW (S301) so the round shape in the pattern is located in the centre of screen.
3. HEIGHT Control (R351) changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2 cm at top and bottom.

HORIZONTAL CENTRE ADJUSTMENT

1. Receive the WG PHILIPS pattern.
2. Set the contrast and colour to minimum, and the bringhtness to centre.
3. Adjust H. CENTRE Control (R451) so the pattern centre can be located at the screen centre.

FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS.(T461) for well defined scanning lines in the centre area on the screen.

R-F AGC ADJUSTMENT

1. Tune the set in the strongest station in your area.
2. Turn AGC DELAY Control (R151) on PIF Board to fully counterclockwise position.
3. Adjust AGC DELAY Control clockwise until noise (snow) disappears on the screen.

PAL MATRIX ADJUSTMENT

1. Tune in the colour programme of the Philips pattern.
2. Set the COLOUR Control to obtain the proper colour.
3. If the PAL MATRIX adjustment is incorrect, the Venetian Blind would appear in the colour bars area. This case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. VR (R551) to minimize the Blind.
6. If the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind again.
7. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear.

CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Turn the SCREEN Control (on T461) fuly counter-clockwise.
3. Set the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) counterclockwise to the minimum position.
4. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the mid position.
5. Set the CUT OFF SW. (S202) in the H. line position.
6. Short temporarily terminal of RASTER CHIP on the CRT DRIVE Board.
7. Set the CONTRAST, COLOUR Controls to minimum and BRIGHTNESS Control to centre. Set the SUB BRIGHTNESS Control to minimum.
8. Rotate the SCREEN Control gradually clockwise until the first horizontal line of a colour (RED, GREEN or BLUE) appears slightly on the screen. Set the SCREEN Control to this position.
9. Open the terminal of RASTER CHIP on the CRT DRIVE Board.
10. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE). The lines may look like white if the CUT OFF Controls are adjusted properly.
11. Return the CUT OFF SW. (S202) in the receiving position.
12. Set the BRIGHTNESS Control to the maximum and COLOUR Control to the minimum.
13. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
14. Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.

SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the CONTRAST Control to the maximum and the BRIGHTNESS Control to the centre.
3. Set the COLOUR Control to the minimum.
4. Set the SUB-BRIGHT. Control (R255) to the centre and leave the receiver for five minutes in this state.
5. Watching the picture well, adjust the SUB-BRIGHT. Control in the position where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
6. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
7. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to the minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT. Control again for the acceptable picture.

SOUND DET (L651) ADJUSTMENT

1. Supply +12V to terminal ① of P101 on IF Board.
2. Connect the SIF generator to pin 16 of IC101 through 0.01 μF capacitor.
3. Connect the oscilloscope to pin 11 of IC101.
4. Set up the SIF generator as described below.
   Sound carrier frequency : 5.5 MHz
   Modulation frequency : 1000 Hz
   Frequency deviation : ±15 kHz
   Signal level : 80 dBμ (50 ohm load)
5. Adjust L651 for the maximum response of 1000 Hz det-out on scope.

PICTURE I-F TRAP ALIGNMENT

GENERAL ..... Refer to figure 1 for the equipment connection.
PRELIMINARY STEPS ..... 1. Turn the power switch of TV set off.
2. Supply +12 volts to terminal ① of P101 on IF Board.
3. Supply +8 volts bias to terminal "TP-14 (pin 3 of IC101)".
4. Turn RF AGC Control (R151) fully clockwise.
SWEEP/MARKER GENERATOR..... Connect to terminal ⑥ of P101 on IF Board.
OSCILLOSCOPE..... Connect through the detector (See figure 3.) to the emitter of Q102.

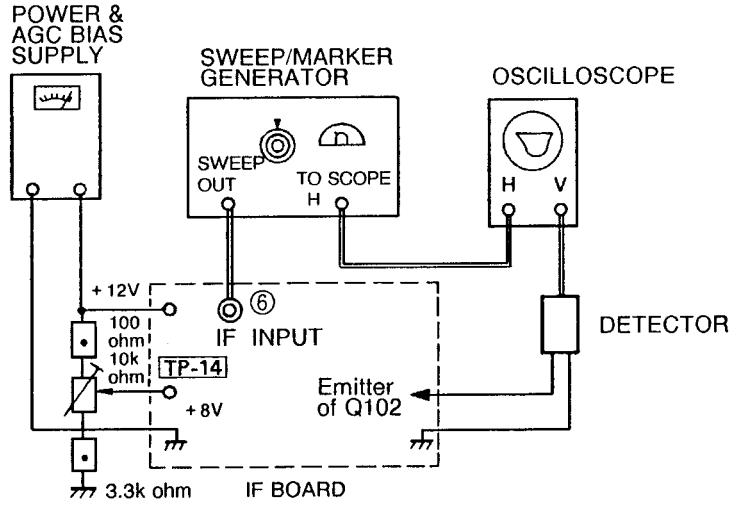


Figure 1.

STEP	SWEEP/MARKER GENERATOR	ADJUST	PROCEDURE
TRAP ALIGNMENT Control the sweep output for easy alignment. Set the IF markers for 40.4MHz (P + 1.5MHz) and 32.4MHz (P –6.5MHz)			
Trap coil TN01	40.4MHz Marker "ON"	TN01	Adjust TN01 so the 40.4MHz marker point is placed at bottom of response. (See figure 2.)
Trap coil TN02	32.4MHz Marker "ON"	TN02	Adjust TN02 so the 32.4MHz marker point is placed at bottom of response. (See figure 2.)

Figure 2. Trap Response

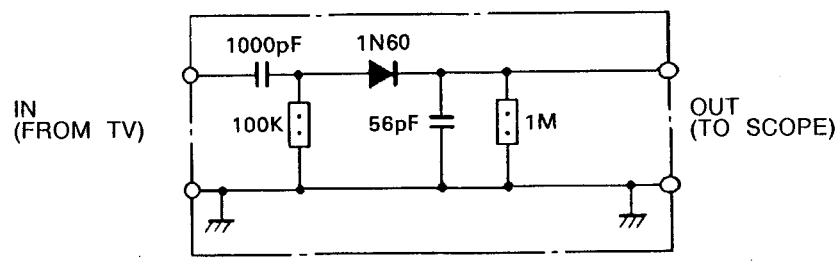


Figure 3. Detector Diagram

PICTURE I-F SWEEP ALIGNMENT

GENERAL	Refer to figure 4 for test equipment connection.
PRELIMINARY STEPS	1. Disconnect the IF Board from the Main Board. 2. Supply +12 volts to the IF Board.
SWEEP/MARKER GENERATOR	Connect to the pin 6 of P101 as shown in figure 4 on the IF Board. Set to 30 ~ 40 MHz sweep with signal level of 75 ~ 85 dBμ.
OSCILLOSCOPE	Connect through the detector to the pin 18 of IC101 on the IF Board.

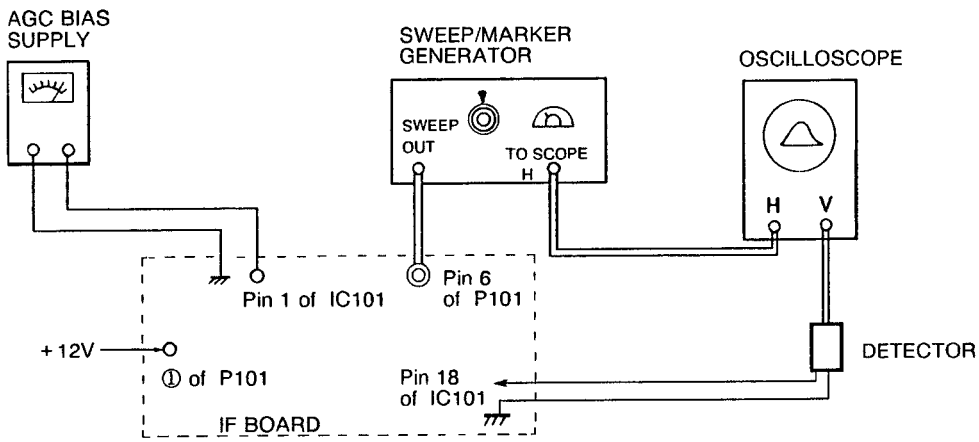


Figure 4. Picture IF Sweep Alignment

STEP	SWEEP/MARKER GENERATOR	ADJUST	REMARKS
Detector Coil	38.9 MHz Marker "ON"	L151	• Supply +2 to +3 volts to pin 1 of IC101 to set the output level for 0.4 Vp-p on the scope. • Adjust L151 so that the marker position (38.9 MHz) on the response can lower to minimum. (See figure 5.)
After completing the above steps, disconnect the equipment and re-solder the links on the Main Board, and adjust the AGC Delay Control (R151) following DELAYED RF AGC ADJUSTMENTS.			

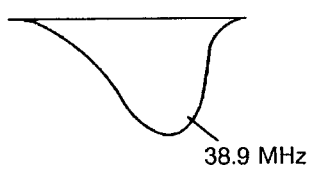
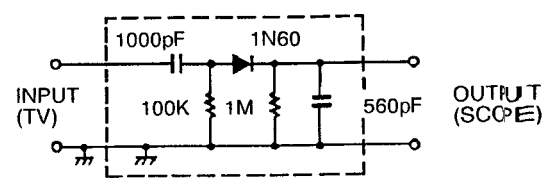


Figure 5. Magnified Response Curve



Detector Diagram

AFC ALIGNMENT

GENERAL ..... Refer to figure 6 for test equipment connection.

PRELIMINARY STEPS ..... 1. Disconnect the IF Board from the Main Board.
2. Supply +12 volts to the IF Board. (Pin 1 of P101)
3. Turn AGC DELAY Control (R151) on the IF Board fully clockwise.

DVM ..... Connect to the resistor R171 (ⓔ in figure 6) and ground.

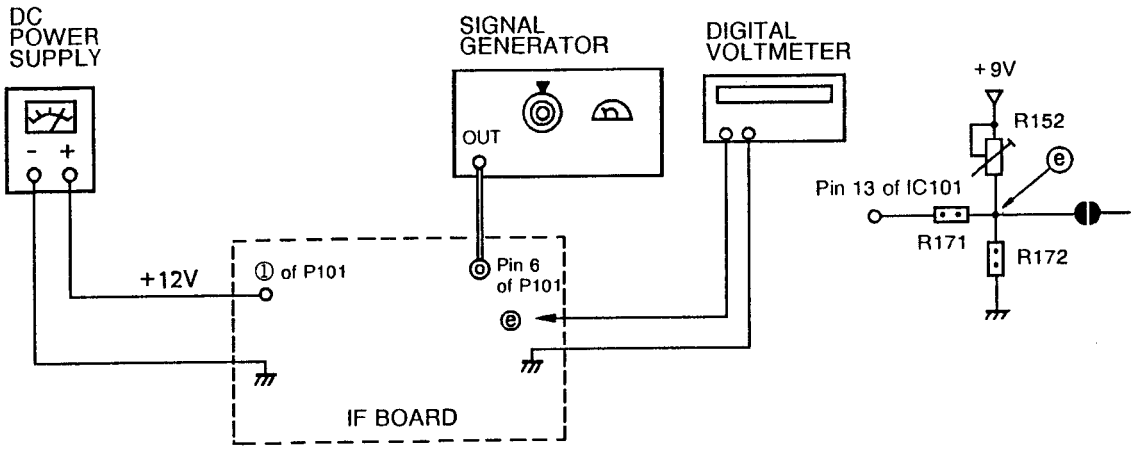
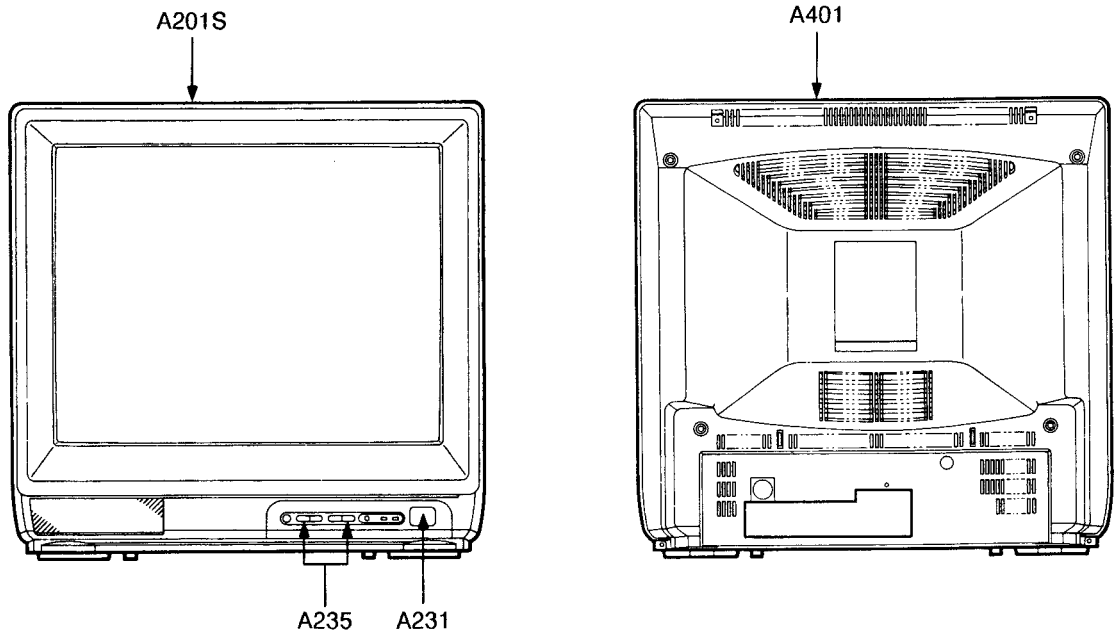


Figure 6. AFC Alignment

STEP	SIGNAL GENERATOR	ADJUST	REMARKS
1. AFC Balance (R152)	NO SIGNAL	R152	• Short the pin 1 of IC101 to ground. • Adjust R152 for 4.5 volts at the point ⓔ in figure 6.
2. AFC Coil (L152)	38.9 MHz CARRIER WAVE (Level : 75 to 85 dBμ)	L152	• Remove the short of pin 1 of IC101. • Connect IF carrier wave to the pin 6 of P101. • Adjust L152 for 2.5 volts on the meter at the point ⓔ.

CABINET REPLACEMENT PARTS LIST



Location No.	Part No.	Description
A201S	23419803	Front Cover
A231	23443506	Button, POWER
A235	23443507	Button, UP-DOWN
A401	23423519	Back Cover
A411	23568284	Label, Model No., B/C
A412	23995762	Label (on B/C)
A701	23523663	Carton Box
A702	23934241	Packing, Bottom
A703	23934242	Packing, Top
A710	23568285	Label, Model No., Carton

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION" , "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE: The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.

Model : 2121RD

ABBREVIATIONS:

Capacitors..... CD : Ceramic Disk PF : Plastic Film EL : Electrolytic
Resistors..... CF : Carbon Film CC : Carbon Composition MF : Metal Film
OMF : Oxide Metal Film VR : Variable Resistor FR : Fusible Resistor

(All CD and PF capacitors are ±5%, 50V and all resistors, ±5%, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24212102	CD, 1000pF, ±10%
C102	24232103	CD, 0.01μF, +80%, -20%
C103	24232103	CD, 0.01μF, +80%, -20%
C104	24206228	EL, 0.22μF, 50V
C105	24232103	CD, 0.01μF, +80%, -20%
C107	24212102	CD, 1000pF, ±10%
C108	24085031	EL, 1μF, ±20%, 25V, Non-Polar
C112	24232103	CD, 0.01μF, +80%, -20%
C116	24232103	CD, 0.01μF, +80%, -20%
C161	24357201	CD, 200pF
C162	24232103	CD, 0.01μF, +80%, -20%
C163	24212102	CD, 1000pF, ±10%
C164	24212102	CD, 1000pF, ±10%
C165	24212102	CD, 1000pF, ±10%
C166	24212102	CD, 1000pF, ±10%
C171	24436220	CD, 22pF
C172	24212102	CD, 1000pF, ±10%
C201	24636100	EL, 10μF, 50V
C202	24795101	EL, 100μF, ±20%, 25V
C203	24232103	CD, 0.01μF, +80%, -20%
C204	24797220	EL, 22μF, ±20%, 50V
C205	24636478	EL, 0.47μF, 50V
C208	24212102	CD, 1000pF, ±10%
C209	24232103	CD, 0.01μF, +80%, -20%
C210	24636100	EL, 10μF, 50V
C211	24212561	CD, 560pF, ±10%
C212	24636010	EL, 1μF, 50V
C301	24636229	EL, 2.2μF, ±20%, 50V
C302	24212152	CD, 1500pF, ±10%
C303	24617912	EL, 2.2μF, ±10%, 50V
C304	24212102	CD, 1000pF, ±10%
C307	24232103	CD, 0.01μF, +80%, -20%
C312	24590243	PF, 0.024μF
C314	24796102	EL, 1000μF, ±20%, 35V
C315	24214221	CD, 220pF, ±10%, 500V
C316	24667332	EL, 3300μF, ±20%, 25V
C317	24617912	EL, 2.2μF, ±10%, 50V
C318	24082049	PF, 0.047μF, 100V
C319	24693104	PF, 0.1μF, 100V
C321	24214561	CD, 560pF, ±10%, 500V

Location No.	Part No.	Description
C328	24212272	CD, 2700pF, ±10%
C402	24353241	CD, 240pF
C403	24636339	EL, 3.3μF, 50V
C405	24590203	PF, 0.02μF
C406	24590203	PF, 0.02μF
C407	24590243	PF, 0.024μF
C408	24636100	EL, 10μF, 50V
C409	24232103	CD, 0.01μF, +80%, -20%
C414	24212471	CD, 470pF, ±10%
C416	24214271	CD, 270pF, ±10%, 500V
⚠C440	24095889	PF, 9100pF, ±3%, 1600V
C441	24214221	CD, 220pF, ±10%, 500V
C443	24214221	CD, 220pF, ±10%, 500V
⚠C444	24092339	CD, 330pF, ±10%, 2kV
C445	24095903	PF, 0.056μF, ±10%, 250V
C447	24644479	EL, 4.7μF, 250V
C448	24795102	EL, 1000μF, ±20%, 25V
C449	24794471	EL, 470μF, ±20%, 16V
C451	24640908	EL, 33μF, ±20%, 160V
⚠C463	24212222	CD, 2200pF, ±10%
C465	24095759	PF, 0.39μF, 200V
C470	24212102	CD, 1000pF, ±10%
C502	24636100	EL, 10μF, 50V
C503	24436101	CD, 100pF
C504	24436101	CD, 100pF
C505	24550273	PF, 0.027μF, 63V
C506	24232103	CD, 0.01μF, +80%, -20%
C508	24085028	EL, 2.2μF, 25V, Non-Polar
C509	24797220	EL, 22μF, ±20%, 50V
C510	24232103	CD, 0.01μF, +80%, -20%
C511	24232103	CD, 0.01μF, +80%, -20%
C512	24353200	CD, 20pF
C513	24353330	CD, 33pF
C518	24232103	CD, 0.01μF, +80%, -20%
C519	24232103	CD, 0.01μF, +80%, -20%
C520	24636478	EL, 0.47μF, 50V
C524	24232103	CD, 0.01μF, +80%, -20%
C525	24436820	CD, 82pF
C526	24436820	CD, 82pF
C527	24436820	CD, 82pF
C528	24232103	CD, 0.01μF, +80%, -20%

Location No.	Part No.	Description
C530	24796220	EL, 22μF, ±20%, 35V
C532	24436330	CD, 33pF
C533	24436330	CD, 33pF
C534	24436240	CD, 24pF
C535	24636100	EL, 10μF, 50V
C536	24636478	EL, 0.47μF, 50V
C537	24794101	EL, 100μF, ±20%, 16V
C539	24232103	CD, 0.01μF, +80%, −20%
C540	24633100	EL, 10μF, 16V
C550	24232103	CD, 0.01μF, +80%, −20%
C551	24212102	CD, 1000pF, ±10%
C601	24436470	CD, 47pF
C602	24436470	CD, 47pF
C603	24232103	CD, 0.01μF, +80%, −20%
C604	24212272	CD, 2700pF, ±10%
C605	24232103	CD, 0.01μF, +80%, −20%
C606	24353620	CD, 62pF
C610	24232103	CD, 0.01μF, +80%, −20%
C611	24232103	CD, 0.01μF, +80%, −20%
C613	24797100	EL, 10μF, ±20%, 50V
C660	24085031	EL, 1μF, ±20%, 25V, Non-Polar
C661	24636100	EL, 10μF, 50V
C662	24636100	EL, 10μF, 50V
C663	24797470	EL, 47μF, ±20%, 50V
C664	24636010	EL, 1μF, 50V
C665	24796221	EL, 220μF, ±20%, 35V
C667	24795471	EL, 470μF, ±20%, 25V
C668	24636478	EL, 0.47μF, 50V
C670	24634220	EL, 22μF, 25V
C671	24232103	CD, 0.01μF, +80%, −20%
C698	24636479	EL, 4.7μF, ±20%, 50V
C699	24634470	EL, 47μF, 25V
⚠C801	24098999	PF, 0.1μF, ±20%, AC250V
C802	24098999	PF, 0.1μF, ±20%, AC250V
C805	24094656	CD, 2200pF, ±20%, AC400V
C806	24094656	CD, 2200pF, ±20%, AC400V
C815	24092281	CD, 4700pF, ±20%, AC250V
C816	24092281	CD, 4700pF, ±20%, AC250V
C817	24092281	CD, 4700pF, ±20%, AC250V
C818	24092281	CD, 4700pF, ±20%, AC250V
C820	24086871	EL, 120μF, ±20%, 400V
C821	24436101	CD, 100pF
C822	24636100	EL, 10μF, 50V
C824	24630747	EL, 22μF, ±20%, 25V
C825	24212102	CD, 1000pF, ±10%
C826	24092339	CD, 330pF, ±10%, 2kV
C827	24232103	CD, 0.01μF, +80%, −20%
C828	24095914	PF, 2200pF, ±3%, 1600V
C829	24636010	EL, 1μF, 50V
C830	24797101	EL, 100μF, ±20%, 50V
C831	24436331	CD, 330pF
C832	24590822	PF, 8200pF
C833	24092336	CD, 180pF, ±10%, 2kV
C834	24086953	EL, 220μF, ±20%, 160V
C835	24797220	EL, 22μF, ±20%, 50V
C836	24214331	CD, 330pF, ±10%, 500V
C837	24797102	EL, 1000μF, ±20%, 50V
C840	24633220	EL, 22μF, 16V
C901	24644479	EL, 4.7μF, 250V
C902	24095923	PF, 4700pF, 1600V
CA01	24212331	CD, 330pF, ±10%
CA07	24212102	CD, 1000pF, ±10%
CA08	24232103	CD, 0.01μF, +80%, −20%
CA09	24794470	EL, 47μF, ±20%, 16V

Location No.	Part No.	Description
CA11	24212472	CD, 4700pF, ±10%
CA12	24212561	CD, 560pF, ±10%
CA13	24633100	EL, 10μF, 16V
CA14	24794470	EL, 47μF, ±20%, 16V
CA15	24232103	CD, 0.01μF, +80%, −20%
CA16	24232103	CD, 0.01μF, +80%, −20%
CA17	24232103	CD, 0.01μF, +80%, −20%
CA18	24232103	CD, 0.01μF, +80%, −20%
CA19	24232103	CD, 0.01μF, +80%, −20%
CA20	24636010	EL, 1μF, 50V
CA21	24436391	CD, 390pF
CA22	24436221	CD, 220pF
CA23	24538224	PF, 0.22μF
CA24	24538334	PF, 0.33μF
CA25	24636229	EL, 2.2μF, ±20%, 50V
CA26	24232103	CD, 0.01μF, +80%, −20%
CA28	24538334	PF, 0.33μF
CA30	24636479	EL, 4.7μF, ±20%, 50V
CA31	24232103	CD, 0.01μF, +80%, −20%
CA32	24794471	EL, 470μF, ±20%, 16V
CA33	24232103	CD, 0.01μF, +80%, −20%
CA40	24232103	CD, 0.01μF, +80%, −20%
CM05	24232103	CD, 0.01μF, +80%, −20%
CM08	24232103	CD, 0.01μF, +80%, −20%
CN02	24436150	CD, 15pF
CN07	24436360	CD, 36pF
CN10	24436101	CD, 100pF
CV29	24085028	EL, 2.2μF, 25V, Non-Polar

RESISTORS

R101	24366152	CF, 1500 ohm
R103	24366152	CF, 1500 ohm
R104	24366103	CF, 10k ohm
R105	24366104	CF, 100k ohm
R106	24366562	CF, 5600 ohm
R107	24366562	CF, 5600 ohm
R108	24366222	CF, 2200 ohm
R109	24366332	CF, 3300 ohm
R110	24366103	CF, 10k ohm
R113	24382560	OMF, 56 ohm, 1W
R115	24366101	CF, 100 ohm
R116	24366102	CF, 1k ohm
R117	24366221	CF, 220 ohm
R118	24552151	OMF, 150 ohm, 1/2W
R119	24366682	CF, 6800 ohm
R120	24366332	CF, 3300 ohm
R121	24366271	CF, 270 ohm
R122	24366271	CF, 270 ohm
R123	24366101	CF, 100 ohm
R125	24366101	CF, 100 ohm
R151	24066953	VR, 5k ohm, 1/10W
R152	24066946	VR, 1M ohm, 1/10W
R161	24366131	CF, 130 ohm
R164	24552101	OMF, 100 ohm, 1/2W
R166	24366680	CF, 68 ohm
R167	24366151	CF, 150 ohm
R168	24366562	CF, 5600 ohm
R169	24366561	CF, 560 ohm
R171	24366102	CF, 1k ohm
R172	24366184	CF, 180k ohm
R204	24366152	CF, 1500 ohm
R205	24366392	CF, 3900 ohm
R208	24366101	CF, 100 ohm
R209	24366103	CF, 10k ohm

Location No.	Part No.	Description
R210	24366203	CF, 20k ohm
R211	24366622	CF, 6200 ohm
R212	24366103	CF, 10k ohm
R213	24366101	CF, 100 ohm
R214	24366182	CF, 1800 ohm
R215	24366152	CF, 1500 ohm
R216	24366333	CF, 33k ohm
R217	24366101	CF, 100 ohm
R218	24366472	CF, 4700 ohm
R219	24366472	CF, 4700 ohm
R220	24366753	CF, 75k ohm
R221	24366564	CF, 560k ohm
R222	24366751	CF, 750 ohm
R223	24366103	CF, 10k ohm
R225	24366152	CF, 1500 ohm
R241	24366101	CF, 100 ohm
R242	24366223	CF, 22k ohm
R243	24366183	CF, 18k ohm
R252	24066598	VR, 2k ohm, 1/10W
R253	24066598	VR, 2k ohm, 1/10W
R255	24066601	VR, 20k ohm, 1/10W
R301	24366301	CF, 300 ohm
R302	24366244	CF, 240k ohm
R303	24366303	CF, 30k ohm
R304	24366102	CF, 1k ohm
R305	24366161	CF, 160 ohm
R306	24366471	CF, 470 ohm
R309	24366102	CF, 1k ohm
R311	24552242	OMF, 2400 ohm, 1/2W
R316	24552821	OMF, 820 ohm, 1/2W
⚠R317	24383271	OMF, 270 ohm, 2W
R318	24366183	CF, 18k ohm
R321	24366163	CF, 16k ohm
R322	24366364	CF, 360k ohm
R323	24322129	OMF, 1.2 ohm, 1W
R325	24552122	OMF, 1200 ohm, 1/2W
⚠R327	24532130	FR, 13 ohm, 1W
R329	24552472	OMF, 4700 ohm, 1/2W
R333	24366471	CF, 470 ohm
R351	24066602	VR, 50k ohm, 1/10W
R377	24366184	CF, 180k ohm
R378	24366364	CF, 360k ohm
R380	24366153	CF, 15k ohm
R402	24366273	CF, 27k ohm
R403	24366302	CF, 3k ohm
R404	24552432	OMF, 4300 ohm, 1/2W
R405	24366511	CF, 510 ohm
R407	24366151	CF, 150 ohm
R408	24366682	CF, 6800 ohm
R411	24366391	CF, 390 ohm
R412	24366121	CF, 120 ohm
⚠R416	24007566	Cement, 2k ohm, 5W
R419	24366510	CF, 51 ohm
R420	24009951	OMF, 1k ohm, 1W
R421	24366105	CF, 1M ohm
R440	24376243	CF, 24k ohm, 1/2W
R441	24552103	OMF, 10k ohm, 1/2W
⚠R442	24383102	OMF, 1k ohm, 2W
⚠R444	24007768	Cement, 15 ohm, 10W
R445	24552330	OMF, 33 ohm, 1/2W
⚠R448	24983159	MF, 1.5 ohm, 1W
R451	24066601	VR, 20k ohm, 1/10W
R501	24366821	CF, 820 ohm
R502	24366334	CF, 330k ohm

Location No.	Part No.	Description
R503	24366202	CF, 2k ohm
R504	24366471	CF, 470 ohm
R505	24366822	CF, 8200 ohm
R507	24366822	CF, 8200 ohm
R508	24366821	CF, 820 ohm
R509	24366203	CF, 20k ohm
R510	24366101	CF, 100 ohm
R511	24366562	CF, 5600 ohm
R512	24366152	CF, 1500 ohm
R513	24366152	CF, 1500 ohm
R515	24366221	CF, 220 ohm
R516	24366221	CF, 220 ohm
R517	24366221	CF, 220 ohm
R521	24366562	CF, 5600 ohm
R522	24360185	CF, 1.8M ohm, 1/8W
R523	24366102	CF, 1k ohm
R524	24366103	CF, 10k ohm
R525	24366103	CF, 10k ohm
R526	24366122	CF, 1200 ohm
R527	24366122	CF, 1200 ohm
⚠R529	24007642	Cement, 5600 ohm, 5W
R531	24366102	CF, 1k ohm
R532	24366242	CF, 2400 ohm
R533	24366132	CF, 1300 ohm
R534	24376104	CF, 100k ohm, 1/2W
R535	24366272	CF, 2700 ohm
R536	24376104	CF, 100k ohm, 1/2W
R537	24366132	CF, 1300 ohm
R538	24366302	CF, 3k ohm
R539	24366132	CF, 1300 ohm
R540	24376104	CF, 100k ohm, 1/2W
R541	24366821	CF, 820 ohm
R542	24366271	CF, 270 ohm
R543	24366512	CF, 5100 ohm
R544	24366101	CF, 100 ohm
R545	24366101	CF, 100 ohm
R547	24366471	CF, 470 ohm
R548	24366471	CF, 470 ohm
R549	24366471	CF, 470 ohm
R551	24066955	VR, 1k ohm, 1/10W
R557	24066598	VR, 2k ohm, 1/10W
R558	24066598	VR, 2k ohm, 1/10W
R559	24066598	VR, 2k ohm, 1/10W
R564	24366101	CF, 100 ohm
R565	24366101	CF, 100 ohm
R567	24366101	CF, 100 ohm
R570	24366103	CF, 10k ohm
R571	24366103	CF, 10k ohm
R572	24366103	CF, 10k ohm
R573	24366104	CF, 100k ohm
⚠R591	24009957	OMF, 10k ohm, 2W
⚠R592	24009957	OMF, 10k ohm, 2W
⚠R593	24009957	OMF, 10k ohm, 2W
R601	24366681	CF, 680 ohm
R610	24366124	CF, 120k ohm
R611	24366103	CF, 10k ohm
R617	24366102	CF, 1k ohm
R618	24366103	CF, 10k ohm
R619	24366222	CF, 2200 ohm
R621	24366562	CF, 5600 ohm
R623	24366473	CF, 47k ohm
R660	24366102	CF, 1k ohm
R661	24366332	CF, 3300 ohm
R662	24552181	OMF, 180 ohm, 1/2W

Location No.	Part No.	Description
R665	24366339	CF, 3.3 ohm
R666	24366752	CF, 7500 ohm
R668	24366152	CF, 1500 ohm
R669	24552331	OMF, 330 ohm, 1/2W
R690	24366273	CF, 27k ohm
R695	24366222	CF, 2200 ohm
R696	24366223	CF, 22k ohm
R697	24366223	CF, 22k ohm
R698	24366472	CF, 4700 ohm
R699	24366332	CF, 3300 ohm
⚠R801	24004914	CC, 5.6M ohm, 1/2W
⚠R802	24007932	Cement, 6.2 ohm, 10W
R810	24377334	CF, 330k ohm, 1W
R814	24366823	CF, 82k ohm
R815	24366221	CF, 220 ohm
R816	24367122	CF, 1200 ohm, ±2%
R817	24321398	OMF, 0.39 ohm, 1/2W
⚠R818	24384153	OMF, 15k ohm, 3W
R819	24366689	CF, 6.8 ohm
R820	24366102	CF, 1k ohm
⚠R821	24007778	Cement, 180 ohm, 7W
R823	24367622	CF, 6200 ohm, ±2%
R824	24367123	CF, 12k ohm, ±2%
⚠R825	24531620	FR, 62 ohm, 1/2W
⚠R826	24007552	Cement, 8200 ohm, 5W
R828	24367102	CF, 1k ohm, ±2%
R829	24382473	OMF, 47k ohm, 1W
R830	24366272	CF, 2700 ohm
R831	24366103	CF, 10k ohm
⚠R832	24383331	OMF, 330 ohm, 2W
R836	24322228	OMF, 0.22 ohm, 1W
⚠R837	24000900	FR, 0.47 ohm, ±10%, 1W
R838	24366392	CF, 3900 ohm
R840	24366103	CF, 10k ohm
R841	24366103	CF, 10k ohm
R842	24366105	CF, 1M ohm
R843	24366105	CF, 1M ohm
R851	24066954	VR, 2k ohm, 1/10W
⚠R890	24000630	PTC Thermistor, Dual
R901	24946272	CC, 2700 ohm, ±10%, 1/2W
R902	24946272	CC, 2700 ohm, ±10%, 1/2W
R903	24946272	CC, 2700 ohm, ±10%, 1/2W
R920	24000919	FR, 1 ohm, 2W
RA01	24366102	CF, 1k ohm
RA04	24366103	CF, 10k ohm
RA05	24366101	CF, 100 ohm
RA06	24366101	CF, 100 ohm
RA07	24366101	CF, 100 ohm
RA08	24366102	CF, 1k ohm
RA10	24366102	CF, 1k ohm
RA11	24366472	CF, 4700 ohm
RA14	24366102	CF, 1k ohm
RA17	24366102	CF, 1k ohm
RA19	24366103	CF, 10k ohm
RA20	24366473	CF, 47k ohm
RA22	24366103	CF, 10k ohm
RA23	24366471	CF, 470 ohm
RA24	24366102	CF, 1k ohm
RA25	24366103	CF, 10k ohm
RA27	24366392	CF, 3900 ohm
RA30	24366271	CF, 270 ohm
RA31	24366102	CF, 1k ohm
RA33	24366103	CF, 10k ohm
RA35	24366103	CF, 10k ohm

Location No.	Part No.	Description
RA38	24366153	CF, 15k ohm
RA39	24366153	CF, 15k ohm
RA40	24366473	CF, 47k ohm
RA41	24366153	CF, 15k ohm
RA42	24366473	CF, 47k ohm
RA43	24366153	CF, 15k ohm
RA44	24366102	CF, 1k ohm
RA45	24366223	CF, 22k ohm
RA46	24366333	CF, 33k ohm
RA47	24366301	CF, 300 ohm
RA48	24366153	CF, 15k ohm
RA49	24366103	CF, 10k ohm
RA60	24366103	CF, 10k ohm
RA61	24360225	CF, 2.2M ohm, 1/8W
RA64	24946226	CC, 22M ohm, ±10%, 1/2W
RA67	24366273	CF, 27k ohm
RA68	24366123	CF, 12k ohm
RA69	24366823	CF, 82k ohm
RA70	24366153	CF, 15k ohm
RA75	24366102	CF, 1k ohm
RA79	24366152	CF, 1500 ohm
RA86	24366392	CF, 3900 ohm
⚠RA97	24383103	OMF, 10k ohm, 2W
RA98	24366333	CF, 33k ohm
RA99	24366224	CF, 220k ohm
RB01	24366333	CF, 33k ohm
RB03	24366103	CF, 10k ohm
RB04	24366103	CF, 10k ohm
RB05	24366332	CF, 3300 ohm
RB06	24366473	CF, 47k ohm
RC06	24366222	CF, 2200 ohm
RC08	24366222	CF, 2200 ohm
RH03	24366102	CF, 1k ohm
RH04	24366392	CF, 3900 ohm
RH05	24366681	CF, 680 ohm
RM07	24366103	CF, 10k ohm
RN02	24366102	CF, 1k ohm
RN05	24366392	CF, 3900 ohm
RN08	24366103	CF, 10k ohm
RR01	24366102	CF, 1k ohm
RR06	24366471	CF, 470 ohm
RV30	24366102	CF, 1k ohm
RV69	24366223	CF, 22k ohm
RV70	24366273	CF, 27k ohm
RV71	24366102	CF, 1k ohm
RV74	24366332	CF, 3300 ohm
RX02	24366101	CF, 100 ohm
RX05	24366101	CF, 100 ohm
RX08	24366101	CF, 100 ohm
RX10	24366101	CF, 100 ohm
RX13	24366102	CF, 1k ohm

COILS & TRANSFORMERS

L102	23262819	Coil, PIF, TRF1071D
L103	23237987	Coil, Peaking, TRF4100AC
L105	23237993	Coil, Peaking, TRF4339AC
L107	23237987	Coil, Peaking, TRF4100AC
L108	23237987	Coil, Peaking, TRF4100AC
L151	23262813	Coil, IF, TRF1077D
L152	23262813	Coil, IF, TRF1077D
L162	23262951	Coil, RF Choke, TRF1019
L201	23237974	Coil, Peaking, TRF4121AC
L311	23103901	Coil (Ferrite Bead), TEM20
L315	23289100	Coil, Peaking, TRF4100AF

Location No.	Part No.	Description
L405	23221739	Coil, Choke, TRF9252D
L406	23103859	Coil (Ferrite Bead), TEM2011
L411	23233945	Coil, Linearity, TLN2164G
L441	23238934	Coil, Peaking, TRF4109AC
⚠L462	----------	DY, Supplied with V901
L503	23237987	Coil, Peaking, TRF4100AC
L551	23250972	Coil, 1H-Delay Matching, TRF5418D
L590	23289221	Coil, Peaking, TRF4221AF
L601	23237986	Coil, Peaking, TRF4120AC
L651	23232946	Coil, Variable, TRF3073D
L801	23221050	Coil, RF Choke, TLN1015
L802	23103859	Coil (Ferrite Bead), TEM2011
L803	23221747	Coil, Choke, TRF9253D
L804	23221747	Coil, Choke, TRF9253D
L805	23222694	Coil, Width, TLN2026
L806	23103859	Coil (Ferrite Bead), TEM2011
L807	23222694	Coil, Width, TLN2026
⚠L901	23200205	Coil, Degaussing, TSB-2333AR
LA01	23238934	Coil, Peaking, TRF4109AC
LA02	23221803	Coil, Choke, TLN3040D
LB01	23262778	Coil, IF, TRF1112
LN02	23237985	Coil, Peaking, TRF4150AC
⚠T401	23224983	Transformer, Horiz. Drive, TLN1039
⚠T461	23236201	Transformer, Flyback, TFB4090AD
⚠T801	23211858	Line Filter, TRF3139
⚠T803	23217074	Transformer, Converter, 47003593
TN01	23232880	Coil, Variable, TRF3505D
TN02	23262843	Coil, PIF Trap, TRF1457D

SEMICONDUCTORS

IC101	23318201	IC, T51496P
IC303	23119548	IC, AN5515
IC408	23319203	IC, MC7812CT
IC501	B0379475	IC, TA8659AN
IC660	23318392	IC, AN5262
IC661	23119668	IC, TDA2611A
IC801	23318232	IC, TDA4601
IC807	23318299	IC, L78MR05-FA
ICA01	23319094	IC, M34300-587SP
ICA02	23318482	IC, M6M80011AP
ICA04	23119441	IC, LA7910
Q102	A6708871	Transistor, 2SC388ATM
Q103	23114691	Transistor, BC557A
Q104	23114689	Transistor, BC547A
Q161	A6708871	Transistor, 2SC388ATM
Q202	23114691	Transistor, BC557A
Q363	23114689	Transistor, BC547A
Q402	A6330069	Transistor, 2SC2482 FA-1
⚠Q404	23314375	Transistor, ON4409
Q502	23114691	Transistor, BC557A
Q503	23114691	Transistor, BC557A
Q505	A6363200	Transistor, 2SC3619
Q506	23114689	Transistor, BC547A
Q507	A6363200	Transistor, 2SC3619
Q508	23114689	Transistor, BC547A
Q509	A6363200	Transistor, 2SC3619
Q510	23114689	Transistor, BC547A
Q514	23114688	Transistor, BC327
Q516	23114689	Transistor, BC547A
Q605	23114689	Transistor, BC547A

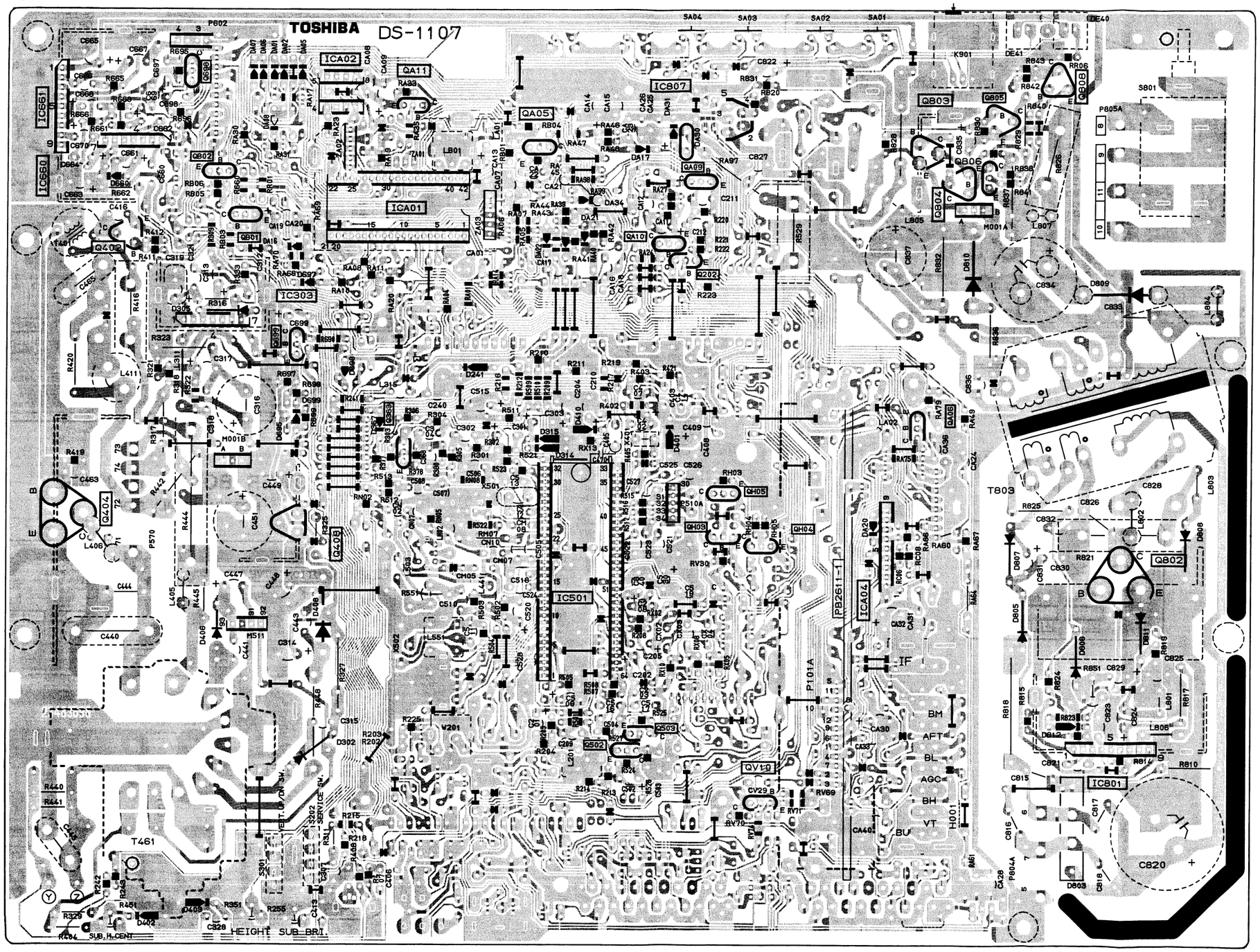
Location No.	Part No.	Description
Q698	A6342206	Transistor, 2SC2878-A
Q699	23114691	Transistor, BC557A
Q802	A6871313	Transistor, 2SD1556(E)
Q803	23314246	Transistor, 2SC2023 LF-4
Q804	A6547303	Transistor, 2SA1321
Q805	A6325067	Transistor, 2SC2230A-Y
Q806	23114546	Transistor, BC557B
Q808	A6547250	Transistor, 2SA1320
QA05	23114689	Transistor, BC547A
QA06	23114689	Transistor, BC547A
QA09	23114691	Transistor, BC557A
QA10	23114689	Transistor, BC547A
QA11	23114546	Transistor, BC557B
QB01	23114689	Transistor, BC547A
QB02	23114689	Transistor, BC547A
QH03	23114689	Transistor, BC547A
QH05	23114689	Transistor, BC547A
QV10	23114689	Transistor, BC547A
D241	A7150041	Diode, 1SS104
D302	23118479	Diode, BYD33J
D305	23118479	Diode, BYD33J
D314	A7117205	Diode, Zener, 04AZ12X
D315	A7116715	Diode, Zener, 04AZ7.5Y
D367	23115599	Diode, 1N4148
D401	A7116925	Diode, Zener, 04AZ9.1Z
D402	A7117715	Diode, Zener, 04AZ20Y
D403	A7117215	Diode, Zener, 04AZ12Y
D406	23118479	Diode, BYD33J
D408	23118052	Diode, RU4Z
D410	A7116815	Diode, Zener, 04AZ8.2Y
D593	23115599	Diode, 1N4148
D594	23115599	Diode, 1N4148
D595	23115599	Diode, 1N4148
D660	23115599	Diode, 1N4148
D695	23115599	Diode, 1N4148
D697	23115599	Diode, 1N4148
D698	23115599	Diode, 1N4148
D699	23115599	Diode, 1N4148
D803	23118173	Diode, RBV-406M-LFA
D805	23118479	Diode, BYD33J
D806	23118479	Diode, BYD33J
D807	23118479	Diode, BYD33J
D808	23118736	Diode, BYV96E
D809	23118451	Diode, RU4A
D810	23118479	Diode, BYD33J
D811	23118479	Diode, BYD33J
D812	A7116515	Diode, Zener, 04AZ6.2Y
DA01	23115599	Diode, 1N4148
DA02	23115599	Diode, 1N4148
DA05	23115599	Diode, 1N4148
DA06	23115599	Diode, 1N4148
DA07	23115599	Diode, 1N4148
DA08	23115599	Diode, 1N4148
DA15	23115599	Diode, 1N4148
DA16	23115599	Diode, 1N4148
DA17	23115599	Diode, 1N4148
DA20	23115599	Diode, 1N4148
DA21	23115599	Diode, 1N4148
DA22	23115599	Diode, 1N4148
DA30	23115878	Diode, Zener, μPC574J(L)
DA31	23115599	Diode, 1N4148
DA34	23115599	Diode, 1N4148
DE40	23118969	Diode (LED), MV57124, Red
DE41	23318436	Diode (LED), MV53124A, Yellow

Location No.	Part No.	Description
MISCELLANEOUS		
⚠F801	23144896	Fuse, 2.0A
F801A	23165433	Holder, Fuse
K901	23120303	Remote Sensor, IR-9109-K
P661	23365430	Earphone Jack
⚠P801	23176705	Power Cord
S202	23145542	Switch, Lever, 1C3P
S301	23145682	Switch, Lever, 1C3P
⚠S801	23145434	Switch, Power, 2C2P
SA01	23145430	Switch, Push, 1C1P
SA02	23145430	Switch, Push, 1C1P
SA03	23145430	Switch, Push, 1C1P
SA04	23145430	Switch, Push, 1C1P
⚠V901A	23902353	Socket, CRT, 10P
W201	23250919	Coil, Delay Line, TRF2069
W661	23151199	Speaker, SPK-1267, 60x70mm, 8 ohm
X401	23153886	Ceramic Resonator, 503kHz, TCR1012
X501	23153979	Crystal, 4.43MHz
X502	23153653	1H-Delay Line, PAL, ED645A-91S
Z101	A5611192	PIF SAW Filter, F1037C
Z102	23107915	Ceramic Video Trap, 5.5 to 5.7MHz, TCF1017
Z103	23107913	Ceramic Video Trap, 6.5MHz, TCF1018
Z601	23107947	Ceramic Filter, 5.5MHz, SFE5.5MBF
Z668	23107742	Filter, TEM1014
Z669	23107742	Filter, TEM1014
ZA01	23153011	Ceramic Resonator, TCR1050
ZA02	24000788	Resistor Block, 4700 ohmx4, 1/8W
ZA03	24094651	Capacitor Block, 100pFx4, 50V
PC BOARD ASSEMBLIES		
U101A	23701232	PIF Board, PB3167-1
U101D	23701233	Headphone Board, PB3167-4
U902A	23701234	Main Board, PB3168
U903A	23336704	CRT Drive Board, PB0044-1
U903B	23336705	Power Board, PB0044-2
PICTURE TUBE		
⚠V901	23112348	Picture Tube, A51EAL30X01
TUNER		
H001	23121561	Tuner, VHF/UHF, EG438
ACCESSORIES		
K902	23120005	Remote Hand Unit, CT-9552
AT03	23305351	Battery Cover
Y101	23561752	Owner's Manual

Location No.	Part No.	Description

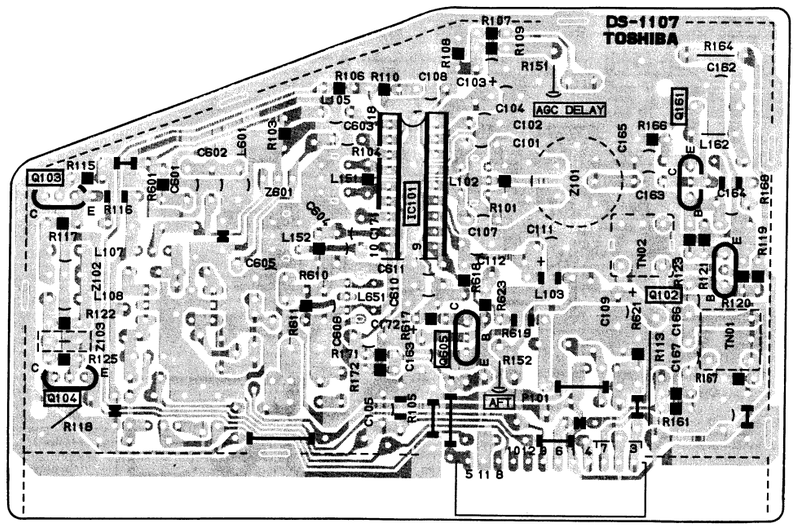
MAIN BOARD PB3168

BOTTOM (FOIL) SIDE



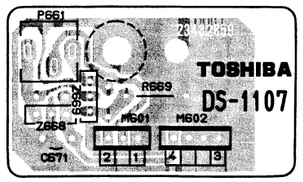
PIF BOARD PB3167-1

BOTTOM (FOIL) SIDE



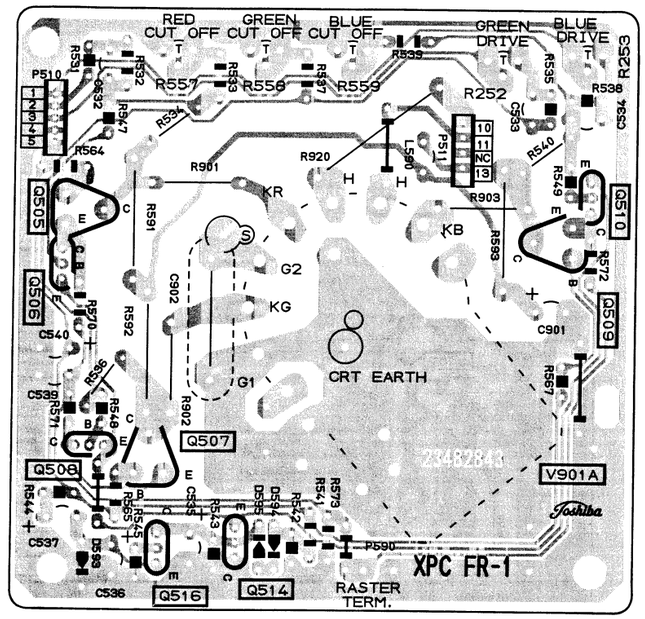
H/P BOARD PB3167-4

BOTTOM (FOIL) SIDE



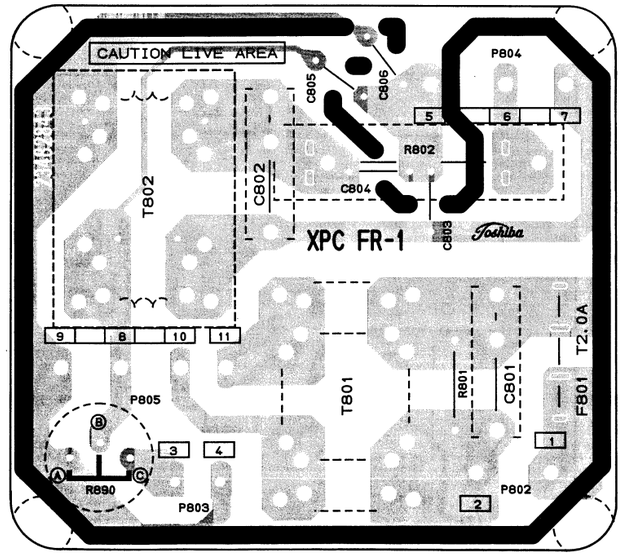
CRT DRIVE BOARD PB0044-1

BOTTOM (FOIL) SIDE



POWER BOARD PB0044-2

BOTTOM (FOIL) SIDE



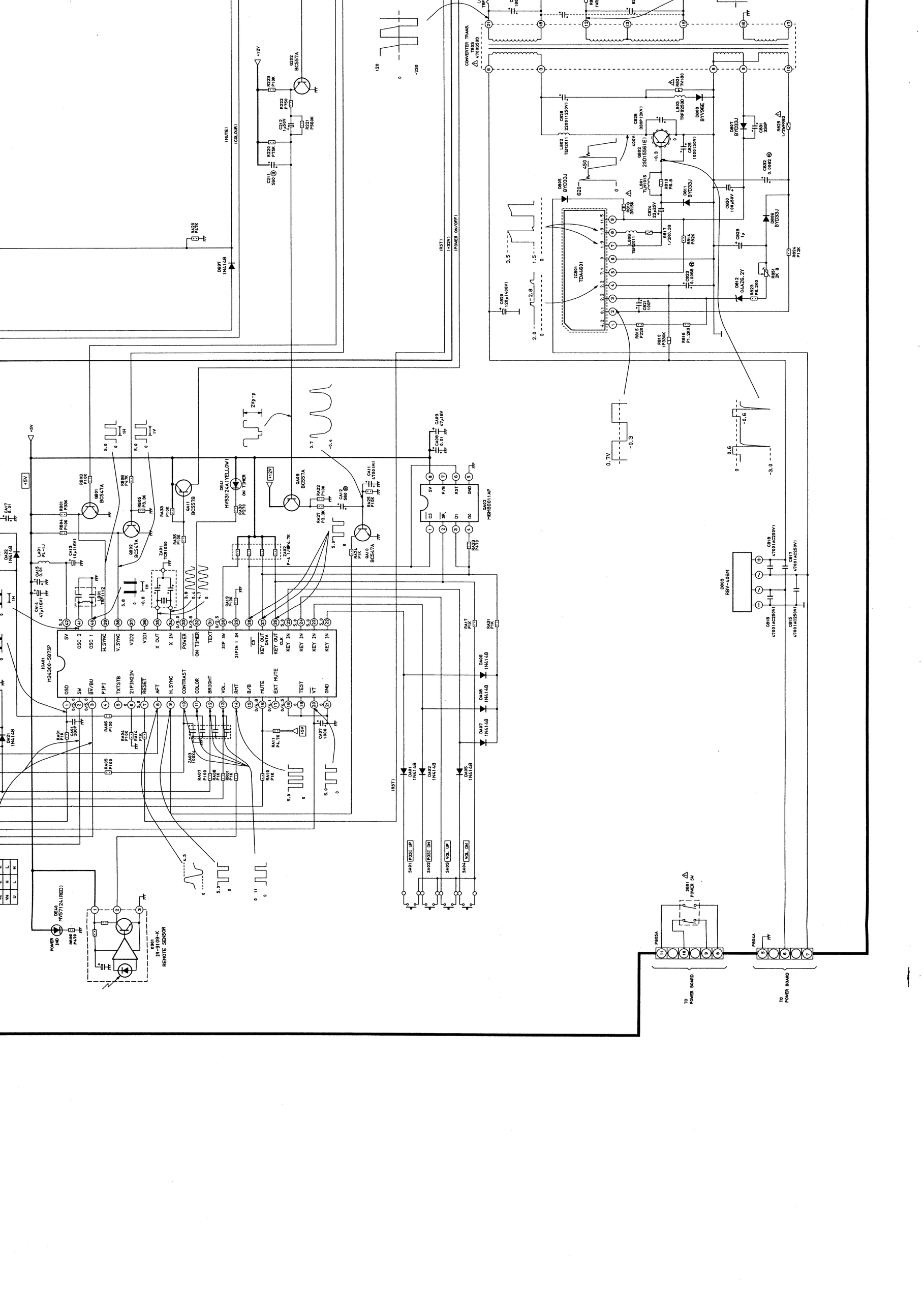
2121RD

SCHEMATIC DIAGRAM (1/2)

U101D H/P BOARD
PB3167-4

U902 M

U101A PIF/SIF BOARD
PB3167-1


IC401
M34300-587SP
OSD
SW
BV/BU
P1P1
TXTSTB
21PIN2IN
RESET
AFT
H.SYNC
CONTRAST
COLOR
BRIGHT
VOL.
RHT
B/B
MUTE
EXT MUTE
TEST
VT
GND
5V
OSC 2
OSC 1
H.SYNC
V.SYNC
VID2
VID1
X OUT
X IN
POWER
ON TIMER
TEXT
SIF 5V
21PIN 1 IN
CS
KEY OUT DATA
CLK
KEY IN
IC801
TDA4601
IC802
M58112
IC803
MSM80011AP
IC901
IR-9109-K
REMOTE SENSOR
POWER IND
CONVERTER TRANS.
T803
POWER ON/OFF
SW801
POWER SW
TO POWER BOARD
P803A
P804A
(MUTE)
(COLOUR)
(RST)
+5V
+12V
+32V

U902 MAIN BOARD PB3168

U903A CRT DRIVE BOARD PB0044-1

130Vp-p

120Vp-p

110Vp-p

5.5Vp-p

5.5Vp-p

5.5Vp-p

1.3Vp-p

0.95Vp-p

0.9Vp-p

0.6Vp-p

0.9Vp-p

2Vp-p (H)

6.0

5.5Vp-p (H)

3.1

0.05Vp-p (2μSEC)

12Vp-p (H)

1.5Vp-p (H)

3Vp-p (V)

3.3Vp-p (V)

1.5Vp-p

RED OUT

GREEN OUT

BLU OUT

RED CUT OFF

GREEN CUT OFF

BLUE CUT OFF

GRN DRIVE

BLU DRIVE

H.CENT.

SUB BRIGHT

BRIGHT (CONT)

(MUTE)

(V-OUT)

(OSD)

(HEATER)

(GND)

(FOCUS)

(SCREEN)

(H.V.)

+12V

+120V

+27V

H.PULS

VIDEO AMP

TX CONT

BRT.BLK.CRAMP

C-Y AMP

G-Y MAT

TV/TX SW

FORCED STANDARD SET.

SYSTEM CONTROL SCANNING

H.V I²L

DE AMP&SW

BURST AMP

DEMO

PAL MATRIX SECAM PERMU

CHROMA AMP

IDENT

APC

CHROMA VCO

VERT

IC501 TA8659AN

Raster

Receive

H.Line

SERVICE SW.

IC501
TA8659AN

VIDEO AMP
TX CONT
BRT.BLK.CRAMP
C-Y AMP
R-Y MAT
G-Y MAT
B
TV/TX SW
FORCED STANDARD SET.
SYSTEM CONTROL SCANNING
H.V I²L
DE AMP&SW
BURST AMP
CW
DEMO
COLOUR
PAL MATRIX SECAM PERMU
CHROMA AMP
IDENT
APC
CHROMA VCO
VERT
H OUT
AFC
32FH OSC
SYNC SEPA

0.6Vp-p
0.9Vp-p
1.5Vp-p(H)
3Vp-p(V)
3.3Vp-p(V)
1Vp-p
0.5Vp-p
1.5Vp-p
28Vp-p(V)
59Vp-p(V)
1.4Vp-p(V)
28Vp-p(H)
8Vp-p(H)
980Vp-p(H)
0.7V
0V
220V
120V
2.6V

Raster
Receive
H.Line 1/2R 2.4K
+12V
SERVICE SW.
S202

+27V
+120V
+5V
H.PULS
TO Q661 GND
AUDIO +8

HEIGHT
VERT. UP/DN SW.
S301

FOCUS
SCREEN
T461
TFB4090AD
HOR.OUTPUT TRANS

L462
DEFLECTION YOKE
VERT COIL
HOR. COIL
P570
M570
M511

CONVERTER TRANS.
T803
47003593

Q609 RU4A
Q803 2SC2023(LF-4)
Q804 2SA1321
Q805 2SC2230A-Y
Q806 BC557B
Q807 L78MR05
Q808 2SA1320
Q810 BYD33J
Q408 MC7812CT
Q303 AN5515 V.OUT
Q402 2SC2482(FA-1) HOR DRIVE
T401 TLN1039 HOR.DRIVE
Q404 ON4409 HOR OUT
Q502 BC557A
Q699 BC557A
Q202 BC557A
Q363 BC547A
D699 1N4148
D695 1N4148
D698 1N4148
D314 04AZ12X
D315 04AZ7.5Y
D241 1SS104FA
D367 1N4148
D403 04AZ12Y
D305 BYD33J
D302 BYD33J
D408 RU4Z
D406 BYD33J
L804 TRF92530
L807 TRN2026
L805 TLN2026
L441 PL-1
L551 TRF5418D
L503 PL-10
L315 PL-10
L311 TEH2017
L408 TEH2011
L405 TRF9252D
L411 TLN21640
X501 4.43M
X502 A91S
1HDL
RA97 2R 10K
R442 2WR1K
R317 2W270
R329 1/2W4.7K
R378 P360K
R380 P15K
R377 P180K
R418 5W 2K
R444 10W15
R445 1/2R33
R420 1WR1K
R440 1/2R24K
R441 1/2WR10K
R447 1WR1.5
R448 1WR1.5
R327 1WFR13
R837 1WFR0.47
R836 1WR0.22
R832 2WR330
R826 5W8.2K
R830 P2.7K
R829 1WR47K
R831 P10K
R820 P1K
R828 P1K
R838 P3.9K
R841 P10K
R840 P10K
R842 P1M
R843 P1M
C840 22μ16V
C838 180(2KV)
C834 220μ(160V)
C837 1000μ
C836 B330(500V)
C827 0.01
C822 10p
C699 47μ25V
C550 0.01
C465 0.39(200V)
C445 0.056(250V)
C240 0.47
C444 330(2KV)
C447 4.7μ250V
C441 220P(500V)
C440 9100(1250V)
C463 2200
C416 270(500V)
C328 2700
C451 33μ160V
C449 470μ(16V)
C448 1000μ25V
C443 220(500V)
C315 220(500V)
C314 1000μ 35V
C318 0.047M(100V)
C321 560(500V)
C312 0.024M
C317 2.2μ
C316 3300μ(25V)
C313 100p 35V
C319 0.1(100V)
C321 560(500V)
C502 10μ
C503 100
C524 0.01
C511 0.01
C510 0.01
C518 0.01
C505 0.01
C510 0.01
C551 1000
C509 22μ
C528 0.01
C520 0.47μ
C502 15
C507 0.01
C508 2.2μ#P25V
C512 20(CH)
C513 33(CH)
C303 2.2μ
C301 2.2μ
C302 1500
C307 0.01
C304 1000
C506 0.01
C505 0.027
C507 0.056
C522 P1.8M
RM07 P10K
RM08 P10K
R504 P470
R503 P2K
R551 1K(B)
R524 P10K
R526 P1.2K
R525 P10K
R501 P820
R505 P8.2K
R509 P20K
R510 P100
R511 P5.6K
R512 P1.5K
R513 P1.5K
R521 P5.6K
R523 P1K
R522 P1.8M
R304 P1K
R306 P470
R309 P1K
R333 P470
R212 P10K
R243 P16K
R242 P22K
R241 P100
R303 P30K
R351 50K(B)
R323 1WR1.2
R325 1/2W1.2K
R322 P360K
R321 P16K
R318 P18K
R319 1/2WR820
R411 P390
R412 P120
R619 P51
R698 P4.7K
R697 P22K
R690 P27K
R699 P3.3K
R509 P20K
R502 P330K
R512 P1.5K
R502 P330K
RN02 P1K
RN05 P3.9K
LN02 PL-15
CN02 15
CN07 36
CN10 100P
CN08 0.01
R215 P1.5K
R311 1/2R 2.4K
R308 P160
C301 2.2μ
C302 1500
C307 0.01
C304 1000
R212 P10K
R243 P16K
R242 P22K
R241 P100
R441 1/2WR10K
R440 1/2R24K
C240 0.47
C445 0.056(250V)
C465 0.39(200V)
L411 TLN21640
R420 1WR1K
R442 2WR1K
C444 330(2KV)
C447 4.7μ250V
C441 220P(500V)
C440 9100(1250V)
C463 2200
C416 270(500V)
C328 2700
C451 33μ160V
C449 470μ(16V)
C448 1000μ25V
C443 220(500V)
C315 220(500V)
C314 1000μ 35V
C318 0.047M(100V)
C321 560(500V)
C312 0.024M
C317 2.2μ
C316 3300μ(25V)
C313 100p 35V
C319 0.1(100V)
C321 560(500V)

2121RD

SCHEMATIC DIAGRAM (2/2)

IMPORTANT SAFETY NOTICE

Component marked with the International Hazard Symbol must, if changed, be replaced by an approved type and must be mounted as the original. This will ensure that the safety standards adhered to during manufacture will be maintained following any servicing procedure.

OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltage readings were obtained using a high impedance digital voltmeter.
2. (—) or ground lead of instruments should be connected to the ground marked (⊥) in the shematic on checking Non-isolated circuit surrounded by mark but should be connected to the points marked (⏚) on checking isolated circuit.
3. The voltage readings may vary as much as ±20%.
4. Check that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for the best picture, making sure that the Contrast, Brightness and Colour controls are set near to their mid-positions.
5. The waveforms were taken using a standard colour bar signal and were observed using a wide band oscilloscope via a low capacity probe.

NOTES:

1. This circuit diagram is subject to change without notice.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 in H.

GROUNDING SYMBOL

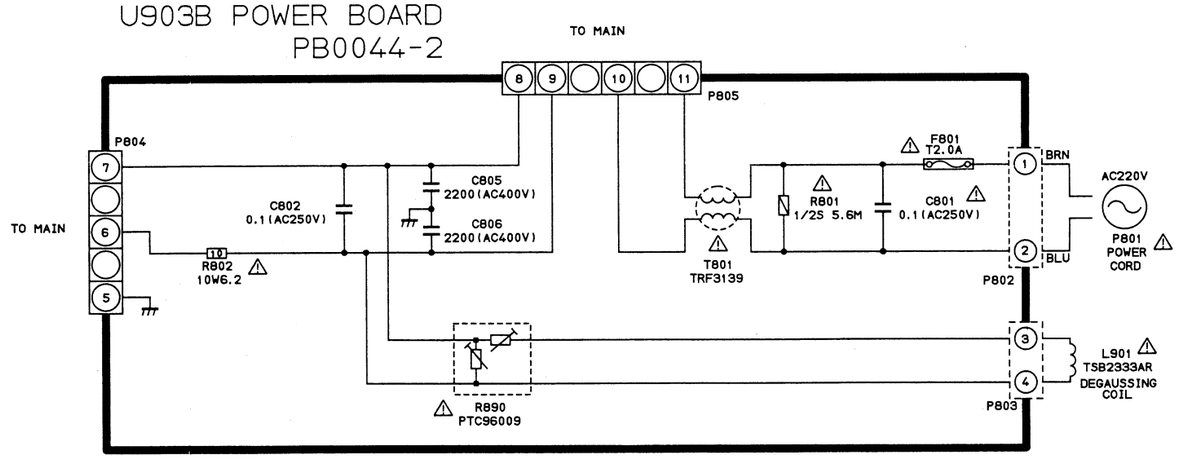
1. ⊥: Non isolated ground, ⏚ : Isolated ground.

RESISTORS

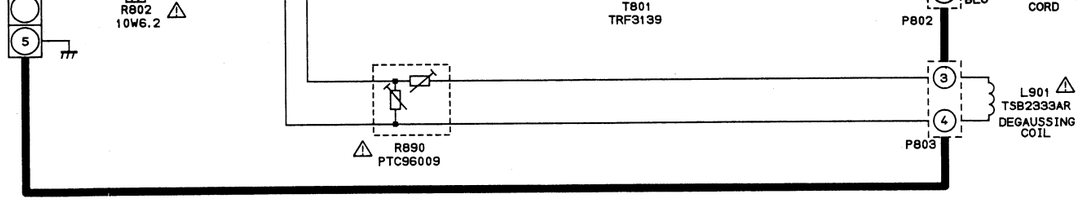
Prefixed to val

TY
Carbon
Oxide Me
Ins. Carb
Wire W
Cement cov
Fusibl

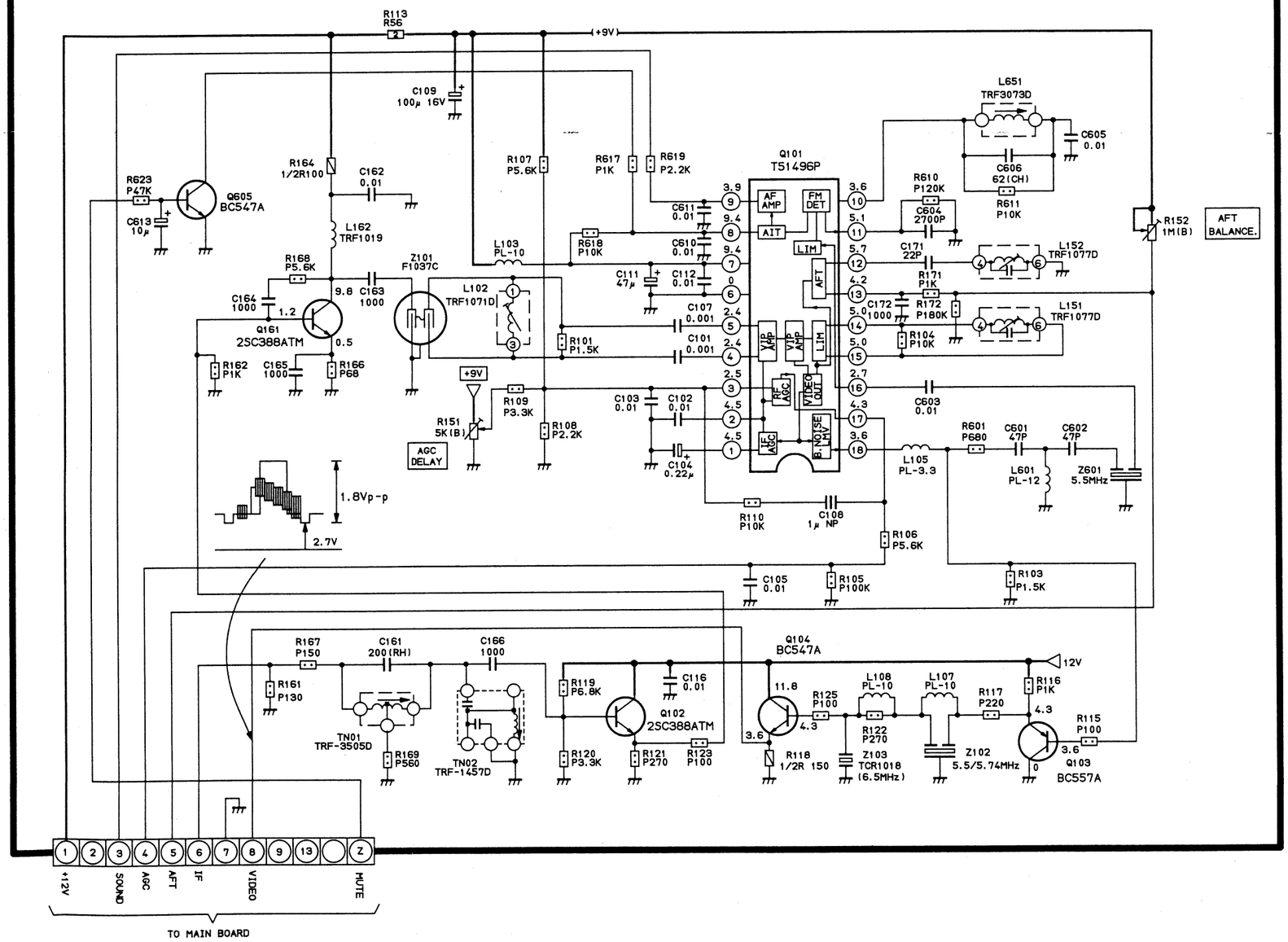
U903B POWER BOARD
PB0044-2



U101A PIF/SIF BOARD PB3167-1



U101A PIF/SIF BOARD PB3167-1



Toshiba 1748

RESISTORS

Prefixed to values:

TYPE	MARK
Carbon Comp.	S
Oxide Metal Film	R
Ins. Carbon Film	P
Wire Wound	W
Cement covered W.W.	NO MARK
Fusible Res.	FR

Suffixes to values:

TOLERANCE	MARK
±1%	(F)
±2%	(G)

Suffixes to VR values:

LAW	MARK
Linear	(B)
'C' Curve Characteristic	(C)

Rating Markings:

WATTAGE	MARK
1/6W	
1/4W	
1/2W	
1W	1
2W	2

WATTAGE	MARK
3W	3
5W	5
10W	10
15W	15
20W	20
25W	25

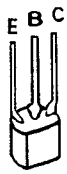
CAPACITORS

Rating Markings:

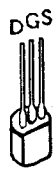
Type	Mark
Ceramic Disc 50V Only	
Electrolytic	
Electrolytic Non-Polar	
Variable Capacitor	
Other	

TERMINAL VIEW OF TRANSISTORS

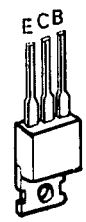
① BC327
BC337
BC547A
BC547B
BC547C
BC557A
BC557B
BC556A



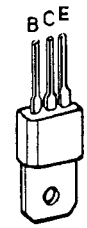
② 2SK30ATM
2SK117



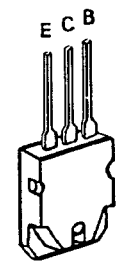
③ BD202



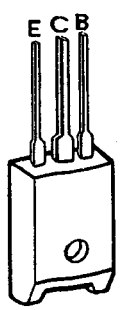
④ BF871
2SD553
2SC1569



⑤ 2SC3678
2SC3182N

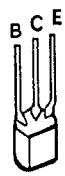


⑥ ON4408
ON4409

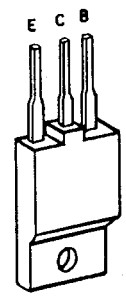


⑦ 2SC2482
2SA1321
2SC2230
2SA1020
2SC2655
2SC752GTM

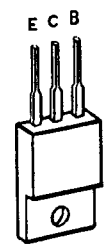
⑧ 2SC388ATM
2SA1015
2SC1959
2SA562TM



⑨ 2SD1548



⑩ 2SC2023



TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105, JAPAN